

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No. 10/003,228

REMARKS

Preliminarily, Applicants affirm the election of Group I, Claims 1-7 drawn to a composition, without traverse, further electing polyamide as the ultimate species of the thermoplastic resin. Applicants reserve the right to file a divisional application directed to non-elected claims 8-12.

Claim 1 has been amended to incorporate therein the recitation of claim 4. Claims 3 and 4 and non-elected claims 8-12 have been canceled.

Entry of the amendments is respectfully requested.

Review and reconsideration on the merits are requested. Claims 1-7 were rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent 6,423,776 to Akkapeddi et al. The Examiner considered Akkapeddi et al. as meeting the terms of the present claims, including the types of materials added and their contents.

Applicants respectfully traverse for the following reasons.

(1) Feature of the Invention.

The resin composition of this invention comprises a thermoplastic resin having a gas-barrier property, an oxidizing organic component and a transition metal catalyst. The thermoplastic resin itself maintains the gas-barrier property without being oxidized, while the oxidizing organic component is oxidized to trap oxygen. Therefore, the resin composition as a whole exhibits excellent oxygen-absorbing property and gas-barrier property.

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In this invention, further, the thermoplastic resin having a solubility parameter (Sp value) of not smaller than 9.5 has a large degree of hydrogen bonding, making it possible to obtain excellent gas shut-off property. Besides, the functional group-containing oxidizing organic component such as a polyene exhibits a large affinity to the thermoplastic resin having a large Sp value due to the presence of the functional group, and favorably disperses in the thermoplastic resin such as the polyamide resin, making it possible to obtain a resin composition that can be excellently worked.

An important feature of the invention, as defined in the amended claims, resides in that the thermoplastic resin having a gas-barrier property and serving as a matrix is not substantially oxidized. More particularly, the claimed xylylene group-containing polyamide resin having an amino end group concentration of not smaller than $40 \text{ eq}/10^6 \text{ g}$ exhibits excellent gas-barrier properties among polyamide resins. As described at page 10, line 16 to page 11, line 1 of the specification, the xylylene group-containing polyamide resin having an amino end group concentration of not smaller than $40 \text{ eq}/10^6 \text{ g}$ is scarcely oxidized, and hardly loses any strength or gas-barrier property due to deterioration by oxidation. Hence, the claimed xylylene group-containing polyamide resin exhibits excellent gas-barrier property over extended periods of time even in the presence of a transition metal catalyst.

On the other hand, even a xylylene group-containing polyamide resin will permit oxygen to permeate in large amount when its amino end group concentration is in a range of 10 to $30 \text{ eq}/10^6 \text{ g}$, as seen from Comparative Example 6 (page 39) of the specification. This means that even a xylylene group-containing polyamide resin is subject to degradation.

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Therefore, even a xylylene group-containing polyamide resin is not capable of exhibiting a sufficient degree of barrier property over extended periods of time, when its amino end group concentration is smaller than $40 \text{ eq}/10^6 \text{ g}$. Thus, amino end group concentration is critical for establishing the requisite gas-barrier property.

The resin composition of this invention separately exhibits the above two functions, namely, oxygen is absorbed exclusively by the oxidizing organic component dispersed in the matrix, and the gas-barrier property is exhibited by a particular xylylene group-containing polyamide resin having an amino end group concentration of not smaller than $40 \text{ eq}/10^6 \text{ g}$, which is the matrix resin.

(2) Differences Between the Invention and Akkapeddi et al.

In the amended claims, the thermoplastic resin has been limited to a xylylene group-containing polyamide resin having an amino end group concentration of not smaller than $40 \text{ eq}/10^6 \text{ g}$ (as disclosed in original claim 4), which is explicitly different from that of Akkapeddi et al.

Akkapeddi et al surely discloses a composition comprising a polyamide resin, an oxidizing organic component and a transition metal catalyst, and encompasses the one (MXD6) having a xylylene group as a polyamide resin.

However, Akkapeddi et al does not disclose the amino end group concentration of the xylylene group-containing polyamide such that the amended claims are not anticipated. Akkapeddi et al also does not teach, suggest or otherwise recognize criticality in the amino end group concentration of the xylylene group-containing polyamide resin in providing a product that

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is not deteriorated by oxidation in the presence of a transition metal catalyst or a gas-barrier property that is maintained over extended periods of time.

As described above, further, the numerical limitation of the amino end group concentration in the xylylene group-containing polyamide resin is critical with respect to preventing a decrease in gas-barrier property due to deterioration by oxidation of the xylylene group-containing polyamide resin. Thus, the amended claims are also not obvious over Akkapeddi et al.

For the above reasons, it is respectfully submitted that the amended claims are neither anticipated nor obvious over Akkapeddi et al, and withdrawal of the foregoing rejection is respectfully requested.

Claims 1, 2, 6 and 7 were rejected under 35 U.S.C. § 102(e) as anticipated by or, in the alternative, under 35 USC 103 (a) as obvious over US 6,406,766 (Rotter et al). Also, claims 1-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Rotter et al.

Applicants respectfully traverse for the following reasons.

Rotter et al attempts to incorporate an oxidation reactive unit into a molecular chain of polyester or polyamide by a polycondensation or ester-exchange reaction. Therefore, Rotter et al is fundamentally different from this invention which seeks to prevent the polyamide from reacting with the oxidizing organic component. However, the respective working examples surely have common portions (Example 4 of this invention, and Examples 1 and 2 of Rotter et al).

In the amended claims, however, the thermoplastic resin is limited to a xylylene group-containing polyamide resin having an amino end group concentration of not smaller than 40 eq/ 10^6 g. Rotter et al does not at all describe an amino end group concentration of the xylylene group-containing polyamide resin, nor suggest what the amino end group concentration should be. Moreover, like Akkapeddi et al, Rotter et al also does not recognize criticality in the claimed group concentration as required by amended claim 1.

For the above reasons, it is respectfully submitted that the present claims are neither anticipated nor obvious over Rotter et al, and withdrawal of the foregoing rejections is respectfully requested.

Withdrawal of all rejections and allowance of claims 1, 2, 5-7 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

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Respectfully submitted,



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